

Lesson 8: Clinical applications of iodinated contrast agents

Aims

- Learning the following topics about the clinical applications of ionic agents:
- Clinical applications of ionic agents
- Clinical applications of nonionic agents
- Routes of administration
- Elimination
- Time to peak opacification
- Laboratory test interactions

Clinical applications of ionic agents

- The diatrizoate products are used for organ and tissue enhancement in CT, x-ray, and fluoroscopy.
- Diatrizoate products:
- Diatrizoate meglumine: for intravenous and urological applications
- Diatrizoate sodium: for intravenous applications

Diatrizoate products

- Since high osmolality is not a major concern in nonvascular procedures, Reno-30 and Hypaque-Cysto are reserved for retrograde cystourethrography when intravenous urography is contraindicated.

Clinical applications of nonionic agents

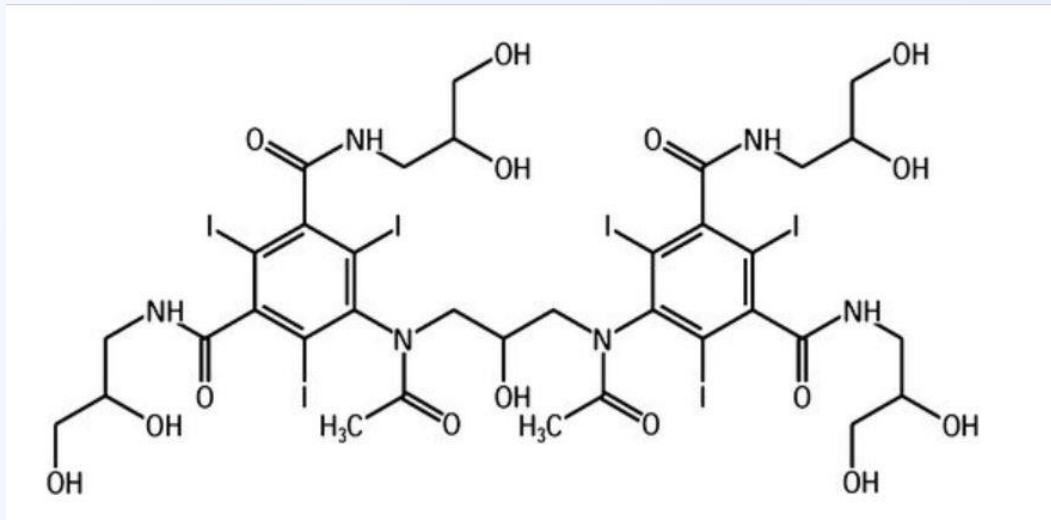
- Angiocardiography
- Arteriography of cerebral arteries
- CT of the head
- Digital subtraction angiography
- Intravenous pyelography
- Peripheral angiography

Clinical applications of nonionic agents

- Orally administered iohexol produces good visualization of the gastrointestinal tract and may be advantageous when barium sulfate is contraindicated (i.e., in patients with suspected bowel perforation).

Iodixanol

- Iodixanol: Visipaque
- The product has the advantage of
- delivering twice the iodine of other contrast agents in an iso-osmotic product.



Routes of administration

- Oral
- Rectal
- Intravenous
- Intravesicular
- Intravertebral
- Intrasplenic

Plasma concentration after IV administration

- The plasma concentration just after injection is strongly related to:
- The dose
- The injection rate

Routes of administration

- Intravesicular administration:
- Bladder examination
- Hysterosalpingography

Properties of agents after IV administration

- Immediately dilution in the circulating blood volume
- Rapidly distribution throughout extracellular fluid
- Very low protein binding
- No significant deposition in tissues

Elimination after IV administration

- Elimination is primarily renal.
- In patients with normal renal function, the intravenous dose is renally excreted.
- 1% to 2% is excreted via biliary elimination and possibly via the intestinal mucosa.

Dialyze

- Iodinated contrast agents are completely dialyzable in two to three sessions.
- The half-life in normal renal function is 30 to 60 minutes but is delayed to 20 to 140 hours in patients with severe renal function impairment

Time to peak opacification

- It is dependent on
- the route of administration.
- Time to peak opacification in angiography is
- immediate
after intravenous administration.

Optimal opacification in urography

- In urography:
- Renal parenchyma, including the renal cortex, is visible
 - 1 minute after rapid injection
- Calyces, pelvis, and ureters are visualized
- 10 to 15 minutes after bolus injection

Optimal opacification in urography

- Optimal opacification is directly dependent on:
- The final urinary iodine concentration
- Urine volume within the respective regions of the urinary tract
- Kidney glomerular filtration rate

Laboratory test interactions

- When thyroid function tests are indicated, it is recommended that they be performed to the administration of any iodinated agent.
- prior
- Studies that are dependent on iodine estimations will not accurately reflect thyroid function for up to 16 days after exposure.

Summary

- Clinical applications of ionic and nonionic agents
- Routes of administration
- Elimination
- Time to peak opacification
- Laboratory test interactions

References

- Widmark JM, Imaging-related medications: a class overview, Proc (Bayl Univ Med Cent) 2007;20(4):408–417.